WHAT IS CLAIMED IS:

Sub A1

1. A temperature-compensated, micromechanical resonator device comprising:

a substrate;

a flexural-mode resonator having first and second ends; and

a temperature-compensating support structure separate from the resonator and anchored to the substrate to support the resonator at the first and second ends above the substrate wherein both the resonator and a support structure are dimensioned and positioned relative to one another so that the resonator has enhanced thermal stability.

2. The device as claimed in claim 1 further comprising a drive electrode structure formed on the substrate at a position to allow electrostatic excitation of the resonator wherein the resonator and the drive electrode structure define a first gap therebetween.

3. The device as claimed in claim 2 wherein the first gap is a submicron lateral capacitive gap.

Sub A2

4. The device as claimed in claim 2 further comprising a sense electrode structure formed on the substrate at a position to sense output current based on motion of the resonator wherein the resonator and the sense electrode define a second gap therebetween.

5. The device as claimed in claim 4 wherein the second gap is a submicron lateral capacitive gap.

6. The device as claimed in claim 1 wherein the resonator is a single resonator beam.

7. The device as claimed in claim 1 wherein the support structure includes an anchor for rigidly anchoring the first end of the resonator to

the substrate and a folding truss support structure for substantially decoupling the second end of the resonator from the substrate.

8. The device as claimed in claim 1 wherein the resonator is a lateral resonator and wherein the support structure includes a pair of stress generating support members dimensioned relative to the resonator so that the resonator has enhanced thermal stability.

9. The device as claimed in claim 1 wherein the resonator is a polysilicon resonator.

10. The device as claimed in claim 9 wherein the resonator is a polysilicon resonator beam.

11. The device as claimed in claim 4 wherein the electrode structures are metal.

12. The device as claimed in claim 11 wherein the electrode structures include plated metal electrodes.

13. The device as claimed in claim 1 wherein the substrate is a semiconductor substrate.

14. The device as claimed in claim 14 wherein the semiconductor substrate is a silicon substrate.

15. The device as claimed in claim 1 wherein the support structure does not substantially vibrate during vibration of the resonator.

16. The device as claimed in claim 1 wherein energy losses to the substrate are substantially reduced to allow higher resonator device *Q*.

17. The device as claimed in claim 8 wherein the support members are rigid against lateral motions.

18. The device as claimed in claim 7 wherein the anchor is an off-axis anchor.

19. The device as claimed in claim 1 wherein the device is a temperature sensor.

Sub B3

20. A micromechanical resonator device having a frequency versus temperature curve, the device comprising:

~~a substrate;~~

a flexural-mode resonator having first and second ends; and

a support structure separate from the resonator and anchored to the substrate to support the resonator at the first and second ends above the substrate wherein both the resonator and a support structure are dimensioned and positioned relative to one another so that the frequency versus temperature curve is specifically tailored.

21. The device as claimed in claim 20 wherein the frequency versus temperature curve is designed to increase temperature dependance of the resonator.

22. The device as claimed in claim 20 wherein the frequency versus temperature curve is designed to have peaks and valleys in predefined locations.

Sub B4 cont

23. A micromechanical resonator device comprising:

a substrate;

a flexural-mode resonator having first and second ends; and

a support structure separate from the resonator and anchored to the substrate to support the resonator at the first and second ends above the substrate wherein both the resonator and a support structure are dimensioned and positioned

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relative to one another so that the device has a substantially zero temperature coefficient temperature at which the device ~~may be biased~~.

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